REMARKS

Applicant acknowledges that the restriction requirement has been made final and that claims 1-32 have been withdrawn from consideration. Claims 38-52 have been added. Claims 33-37 have been rejected.

Rejections under 35 U.S.C. §112

Claims 33-37 have been rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the invention. The Office has expressed concerns regarding the term "result in" in Claim 33 and the connectivity of the inlet port and outlet ports in Claim 34.

Applicant respectfully traverses. However, solely to expedite prosecution and without acquiescing to the rejection, Applicant has amended Claim 34 to provide further details regarding the connectivity of the inlet and outlet ports and have amended Claim 33 to recite:

> 33. An apparatus comprising
>
> a container having a solution of a target molecule and a substrate therein; and
>
> a temperature control system, wherein said temperature control system creates a temperature gradient in the solution sufficient to produce movement of the target molecule through the solution towards a surface of the substrate and wherein said temperature gradient is substantially perpendicular to the surface of the substrate.

Applicant asserts that the amended claims are definite. Applicant requests that the rejection be withdrawn.

Rejections under 35 U.S.C. §102

Ke

Claims 33-35 and 37 have been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Ke *et al.* (1996) Nucleic Acids Research 24:707-712 ("Ke"). Applicant respectfully traverses the rejection.

Ke is cited for its description of an apparatus for temperature gradient gel electrophoresis (TGGE). TGGE is a technique used to determine the melting temperatures of DNA and RNA

fragments. The sample is embedded in a restricted region of a gel plate. An electric field is applied across the gel, and the molecules within the sample move through the gel at speeds determined by their mobility through the gel.

A temperature gradient can be applied to the gel. As the molecules move through the gel (as a result of the application of the electric field), the molecules encounter different temperature zones. Different temperatures are used because the molecules denature at different temperatures. Thus, the temperature gradient is used to denature the DNA and not to drive movement of a target molecule.

In contrast to TGGE, the claimed invention does not rely on the use of electrophoresis to drive the movement of the target molecule. Rather, a temperature gradient is applied to a solution of the target molecule wherein the temperature gradient is sufficient to drive the movement of the target molecule through the solution.

Accordingly, the cited art does not disclose every element of the claims with sufficient specificity to anticipate them. Applicant requests that the rejection be withdrawn.

Blumenfeld

Claims 33-37 have been rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Blumenfeld *et al.* U.S. Patent No. 6,733,729 ("Blumenfeld"). Applicant traverses this rejection.

Blumenfeld is cited as describing an apparatus comprising a fluid cell having a base, a glass slide, liquid and a cover, a slide assembly having two slides with acrylamide gel disposed between the slide, or a silicon DNA chip.

Blumenfeld creases a temperature gradient parallel to the surface of a substrate by placing the substrate on a silicon wafer with an electric current passing through it. A solution of the desired species is applied and the temperature(s) at which the species bind to the substrate can be determined by observing the regions of the substrate where the temperature is lower than the "denaturation" temperature. Since temperature changes are correlated with position, the temperature gradient parallel to the surface is desirably small. Blumenfeld suggests the use of gradients of 0.1°C/mm to 1.0 °C/mm.

The invention as claimed recites a temperature gradient sufficient to produce movement of the target molecule through the solution. In contrast, Applicant respectfully submits that the temperature gradients described by Blumenfeld are not sufficient strength to result in the thermophoretic force required to move the target molecules through a solution. Moreover, the performance of Blumenfeld's method improves as the gradient is reduced; whereas the performance of the presently claimed invention improves as the gradient increases.

Finally, the temperature gradients used in the presently claimed invention are substantially perpendicular to the surface of the substrate whereas the temperature gradient in Blumenfeld is parallel to the surface of a substrate.

Accordingly, the cited art does not disclose every element of the claims with sufficient specificity to anticipate them. Applicant requests that the rejection be withdrawn.

Nakao

Claims 33-35 have been rejected under 35 U.S.C. §102(e) as being allegedly anticipated by Nakao *et al.* U.S. Patent No. 6,589,740 ("Nakao"). Applicant respectfully traverses this rejection.

Nakao is cited for is description of an apparatus for imposing a thermal gradient on a slab gel containing oligonucleotides wherein the temperature gradient is a denaturing gradient. In contrast to the claimed apparatus, Nakao emphasizes that the temperature of the container and the solution should be kept equal so no temperature gradient is formed. See Nakao, column 6, lines 1-10. More specifically, Nakao teaches that the temperature should remain constant for a period of time. After the temperature of the biochip has equilibrated, the biochip is imaged and only then is the temperature changed. See, e.g., Nakao, claim 1, and column 2, lines 44-46. This is also illustrated graphically in Figure 11. The figure shows that the temperature of the biochip is held constant for a periods of about 10 minutes and then is brought to a new temperature which again is held constant for a period of time.

Nakao does not teach or suggest the use of thermophoresis to drive the movement of a target molecule through a solution. Accordingly, the cited art does not disclose every element of the claims with sufficient specificity to anticipate them. Applicant requests that the rejection be withdrawn.

If there is any fee due in connection with the filing of this Response, please charge the fee to our Deposit Account No. 06-0916.

Respectfully submitted,

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